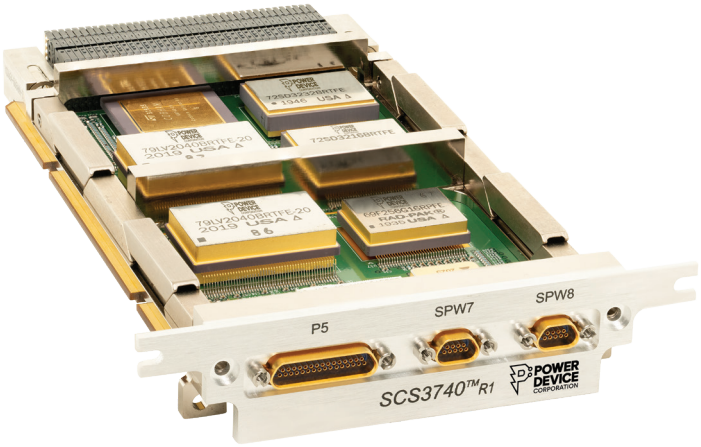
High-Speed, SWaP Optimized 3U SpaceVPX Rad Hard SBC

Product Brief

Model: SCS3740



PDC's space-proven Single Board Computer (SBC) product line now includes a compact, high performance (up to 1,700 DMIPS and 1 GFLOP) SWaP optimized 3U SpaceVPX product, offering many I/O options, including: SpaceWire, UART, CANbus, I²C, SPI, GPIO,1553, and Ethernet. Since the inception of our Space Microelectronics group, more than 20 years ago, our rad-hard SpCOTS™ and SBC products have experienced zero failures in space!

Key Features

Performance

- GR740 Rad-Hard quad-core LEON 4FT® processor
- High speed processing – up to 1,700 DMIPS and 1 GFLOP

Memory

- 128 MB of EDAC corrected SDRAM
- 32 GB of BCH corrected NAND with Flash File System
- 4 MB of EDAC corrected EEPROM memory

I/O Interfaces

- Integrated SpaceWire router: (8) General purpose SpaceWire ports (up to 200 Mbps each) and (1) SpW debug port
- (2) UART (RS-422 or LVDS)
- (2) CANbus, (2) I²C, (1) SPI, GPIO and (1) 1553 (requires external PHY)
- (1) Ethernet (available in flight & non-flight options)

Operating & Environmental Specifications

- 3U SpaceVPX board weighing 550 Grams
- Outstanding SBC radiation hardness
  - TID greater than 100krad (Si) mission dependent
  - Single Event Effects: 1 Upset in 120 Years (GEO)
- Low Power Consumption
  - Input Voltage: 3.3V only; 5W typical, 9W maximum
- Acceptance Level Temp: -30°C ±3°C to +70°C ±3°C
- Qualification Level Temp: -40°C ±3°C to +80°C ±3°C

Benefits

- Size, weight & power (SWaP) optimized: highly integrated SoC (system on a chip) LEON quad-core processor reduces overall parts count, enabling low power consumption and high performance, up to 1700 DMIPS, in a compact 3U SpaceVPX
- Many I/O options: provides flexibility to match a wide range of mission requirements
- Proven reliability: built on PDC's established pedigree of TRL-9 single board computers, and utilizes PDC's flight proven rad-hard Sp-COTS™ memory products
- Integrated SpaceWire router supports SpaceVPX Control Plane
- I²C supports SpaceVPX Utility Plane
- High performance computing for demanding space applications
- Ease of use
  - Development Kit available - provides easy I/O access, enabling rapid prototyping or demonstration in a lab
  - Board support package (BSP available)
  - Real-time operating system support: Wind River VxWorks® (standard), RTEMS™ & Linux® (contact factory)

Applications

- Launchers
- Satellites
- Payload processing
- Command & control

For more information: www.powerdevicecorp.com/SCS3740

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Overview

The SCS3740 is the first off-the-shelf Quad Core LEON 4FT 3U SpaceVPX SBC and is SWaP (size, weight and power) optimized in a compact form factor – weighing 550 grams, with a low power consumption of only 5 Watts (typical). With excellent radiation performance for total ionizing dose (TID >100krad(Si)) mission dependent and Single Event Effects (1 upset in 120 years (GEO)), the SCS3740 provides high performance processing (up to 1700 DMIPS and 1 GFLOP) in a compact 3U SpaceVPX form factor. It incorporates several of PDC's Rad-Hard Sp-COTS™ (Space Commercial Off-the-Shelf) memories including 32GB of error corrected NAND Flash (which includes a Flash File System), 128MB SDRAM and 4MB EEPROM. In addition it offers many I/O options including (8) SpaceWire ports (200Mb/sec), (2) UARTs (RS422 or LVDS), (2) CANbus, (2) I²C, (1) SPI, GPIO, (1)1553 and (1) Ethernet (available both in flight and non-flight configurations).

The SCS3740 allows PDC to offer significant processing and I/O capabilities without requiring significant power or space from the host platform, hitting a sweet spot for rad-hard system integrators that need to minimize SWaP.

PDC also offers a Development Kit designed to get the user up and running quickly in a lab environment. The kit includes chassis, power supply and breakout boards, providing easy access to I/Os on the SCS3740.

Custom Design Capability – PDC can customize designs for all products, ranging from simple modifications of standard products to fully customized solutions for commercial, military, aerospace, and industrial applications.

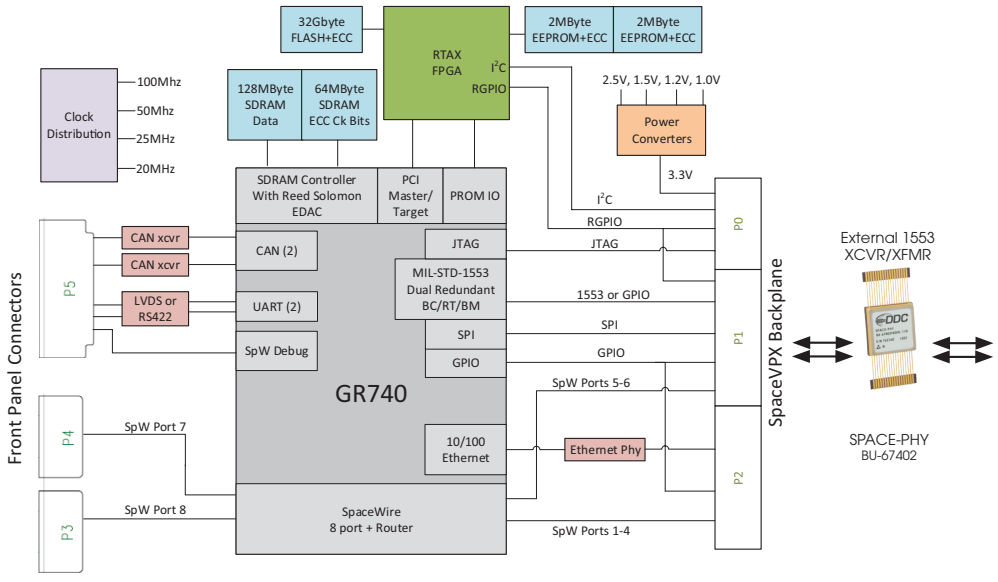
Ordering Information

SCS3740R1XXX-XX

- **UART Location:**
  - **Blank** = Standard – Two differential UART interfaces available at the front panel
  - **UB** = Non-Standard – One differential UART interface available at the front panel and one available at the backplane
- **PPS Location:**
  - **Blank** = Standard – Differential input, PPS_IN, available at the backplane
  - **PF** = Non-Standard – Differential input, PPS_IN, available at the front panel
- **Screening Flow:**
  - **S** = Flight Grade – Components screened to Class S/K or equivalent
  - **B** = Flight Grade – Components screened to Class B/H or equivalent
  - **E** = Engineering Grade – EM level components Room temp tested.
- **Ethernet PHY:**
  - **EN** = Ethernet PHY not installed
  - **EY** = Ethernet PHY installed
- **Serial Port Signaling:**
  - **LV** = LVDS
  - **RS** = RS-422
- **Base Part Number**
  - 3U SpaceVPX single board computer

SCS3740R1DK – SCS3740R1 Development Kit

Block Diagram



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